

**Environmental
Resources
Management**

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14 February 2014

Mr. Roger Papler
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612



Subject: Revised Third Addendum to Work Plan to
Evaluate Potential Vapor Intrusion
Intersil/Siemens Site, Indoor Air Study Area
Cupertino, California
Site Cleanup Requirements Order No. 90-119

Dear Mr. Papler:

On behalf of SMI Holding LLC (SMI), ERM-West, Inc. (ERM) has prepared this *Revised Third Addendum to Work Plan to Evaluate Potential Vapor Intrusion* (Third Addendum) for the Intersil/Siemens Superfund Site in Cupertino, California (the site, Figure 1). The Third Addendum was initially prepared pursuant to a letter from the Regional Water Quality Control Board, San Francisco Bay Region (RWQCB), and the United States Environmental Protection Agency (USEPA) to GE and SMI dated 11 December 2013.¹

This revised Third Addendum is substantially the document prepared in response to the 11 December 2013 letter. In addition, this revision responds to comments from USEPA and RWQCB on the Third Addendum, incorporates discussions among the parties, and reflects the results of the pre-sampling field inspection. Specifically, this revised Third Addendum includes the following:

- The workplan to evaluate the potential for vapor intrusion prepared in response to the 11 December 2013 letter from USEPA and RWQCB;

² RWQCB, San Francisco Bay Region. 2013. *Requirement for Vapor Intrusion Evaluation Workplan for 10900 and 10950 North Tantau Avenue, Cupertino, Santa Clara County*. 11 December.

- Comments from the 21 January 2014 USEPA memorandum submitted to the RWQCB²;
- Agreements reached during telephone conversations on 28 January 2014 between SMI, General Electric Company (GE), RWQCB and USEPA representatives regarding the 21 January comments; and
- The results of a pre-sampling inspection conducted with USEPA, SMI, and property tenant representatives on 11 February 2014.

As agreed to by USEPA and RWQCB, USEPA comment 7 from the 21 January 2014 USEPA memorandum (Discussion of Prior Sampling Results) will be addressed within the summary report completed following sampling.

The 11 December 2013 letter requires GE and SMI to address the following items:

- Cold weather residential indoor air sampling during the months of January and February 2014;
- Commercial indoor air sampling with the heating, ventilation, and air conditioning (HVAC) system turned off in the on-property building at the former Siemens facility;
- Vapor intrusion evaluation in residential and commercial buildings where groundwater-trichloroethene (TCE) levels exceed 5 micrograms per liter ($\mu\text{g/L}$); and
- Comparison of indoor air sampling results to the TCE short-term removal action levels and USEPA's updated long-term TCE screening levels.

As a plan for sampling commercial indoor air, this Third Addendum addresses the relevant second (commercial sampling with HVAC system off at former Siemens facility) and fourth bullets. AMEC

² USEPA, 2014. *Comments on January 8, 2014 Second and Third Addendums to Work Plan to Evaluate Potential Vapor Intrusion, Intersil/Siemens Site, Indoor Air Study Area, Cupertino, California*. 21 January.

Environment & Infrastructure, Inc. (AMEC) has prepared a work plan for sampling residential indoor air for the off-site study area that addresses the first, third, and fourth bullets.

WORK PLAN

This Third Addendum is supplemental to the *Work Plan to Evaluate Potential Vapor Intrusion* (2012 Work Plan) submitted by AMEC on behalf of GE and SMI in February 2012 (AMEC, 2012a³). In addition, this Third Addendum is consistent with the *Revised Addendum to Work Plan to Evaluate Potential Vapor Intrusion* submitted by AMEC on behalf of GE and SMI in August 2012 (AMEC, 2012b⁴).

Specific information from the 2012 Work Plan that is relevant to this investigation, but does not change, is not repeated herein. The 2012 Work Plan sections that are not repeated in part or entirely are:

- Section 1.0 – Introduction; changes to the project organization and project personnel from the 2012 Work Plan are discussed in this Third Addendum.
- Section 3.0 – Field Sampling Plan; changes from the 2012 Work Plan are discussed in the Revised Addendum. Where there is no variation from the 2012 Work Plan, details are not repeated in this Third Addendum.
- Section 4.0 – Data Evaluation and Reporting.
- Section 5.0 – General Mitigation Approach; conceptually the overall mitigation approach does not change. Implementation at a large commercial/industrial building will differ from a residence.
- Appendix A – Quality Assurance Project Plan (QAPP).

³ AMEC. 2012a. *Work Plan to Evaluate Potential Vapor Intrusion, Intersil/Siemens Site, Indoor Air Study Area, Cupertino, California*. 12 February.

⁴ AMEC. 2012b. *Revised Addendum to Work Plan to Evaluate Potential Vapor Intrusion, Former AMI Building 700/800, Cupertino, California*. 20 August.

Therefore, this Third Addendum addresses changes to Section 2 of the 2012 Work Plan (Overall Approach), as well as portions of Sections 1 and 3, as noted above.

INTRODUCTION

The roles and responsibilities have not changed from the 2012 Work Plan; but the project personnel responsible for the implementation have changed. The project team roles include:

- RWQCB Project Manager – Mr. Roger Papler;
- USEPA Superfund Project Manager and Technical Lead – Ms. Melanie Morash;
- USEPA Quality Assurance Point of Contact – Mr. Mathew Plate;
- Program Principal-in-Charge and Technical Lead – Mr. Ben Leslie-Bole for ERM;
- Project Manager – Ms. Heather Balfour for ERM;
- Human Health Risk Assessor – Mr. Mark Jones for ERM;
- Field Team Lead – Conor McDonough for ERM;
- Quality Assurance Officer – Ms. Sandra Mulhearn for ERM; and
- Eurofins Air Toxics Inc. (Air Toxics) Laboratory Point of Contact – Ms. Kelly Buettner.

OVERALL APPROACH

This Third Addendum describes field sampling activities, evaluation and reporting of results, and a general mitigation approach (if necessary).

The field investigation will include the following components:

- Obtain access to the former Siemens building (access agreement reached on 7 February);
- Complete a pre-sampling questionnaire and conduct real-time low concentration (i.e., parts-per-billion by volume [ppbv]) photoionization detector (PID) monitoring capable of detecting total volatile organic compounds (VOCs) at concentrations less than

10 ppbv during a pre-sampling site inspection (site walk conducted on 11 February);

- Collect representative air quality samples;
- Analyze air samples at an off-site laboratory; and
- Evaluate the results and prepare a report.

Indoor air and outdoor (ambient) air samples will be collected and analyzed for chemicals of concern (COCs) and chloroform (Table 1) using USEPA Test Method TO-15 for selective ion monitoring (SIM) to achieve low-level reporting limits.

Study Area – Former Siemens Building

The former Siemens building consists of two, two-story structures constructed on a common concrete slab. The first building faces Homestead Road (19000 Homestead Road, 49,550 square feet) and the second faces North Tantau Avenue (10950 North Tantau Avenue, 52,230 square feet); both buildings were constructed in approximately 1968 (Figure 2). The first floors of the buildings are connected and the second floors are physically separated. The combined structures operate under five different HVAC zones.

Kaiser Permanente, the current site tenant, provides a number of health-care services, including a mind-body wellness center, chemical dependency clinic, child and adolescent psychiatry unit, and adult psychiatry unit.

Analyses

The COCs for this investigation are the same as those for the 2012 Work Plan (chemical specified with remediation goals in the Cleanup and Abatement Order 90-119) and any additional VOCs detected in grab groundwater sampling collected from A1 depth interval in the Off-Site Study Area. In addition, samples will be analyzed for chloroform at the request of USEPA to evaluate whether chemicals in indoor air may be present in air unrelated to subsurface sources.

Data Quality Objectives

The data quality objectives of this investigation are the same as those described in the 2012 Work Plan for indoor air sampling.

Data Evaluation

The analytical results of indoor air samples will be evaluated by three tiers of screening levels (Table 1):

- Tier 1 – Comparison to background/ outdoor air collected concurrently with indoor air samples;
- Tier 2 – Short-term health-based criteria including Minimum Risk Levels (MRLs) (ASTDR, 2013⁵) or Interim Short-term Response Action Levels for TCE (USEPA, 2013b⁶); and
- Tier 3 - Long-term human health-based screening criteria including USEPA's Regional Screening Levels (RSLs; see below) (USEPA, 2013a⁷) or California-modified indoor air screening levels for tetrachloroethene (USEPA, 2013b).

Table 1 lists the COCs and their respective RSL and MRL screening criteria for indoor/ outdoor air sample data. Table 1 also lists the laboratory reporting limits for each COC using low-level (SIM) TO-15 analysis. As shown on Table 1, the laboratory reporting limits are lower than regulatory screening levels.

FIELD SAMPLING PLAN

This section presents the methodologies for completing field sampling activities to evaluate indoor air quality at the former Siemens building. Field sampling activities will be implemented by ERM personnel with possible accompaniment from representatives of USEPA and/or the RWQCB.

⁵ Agency for Toxic Substances & Disease Registry (ATSDR). 2013. *Minimum Risk Levels (MRLs) for Hazardous Substances*. July.

⁶ USEPA. 2013b. Memorandum from Kathleen Salyer of USEPA to Stephen Hill, Chief, Toxic Cleanup Division, California Regional Water Quality Control Board. 3 December.

⁷ USEPA. 2013a. *Regional Screening Levels for Chemical Contaminants at Superfund Sites*. November.

Schedule

Kaiser Permanente normally provides health care services every day for a total of 16 hours. For this sampling effort, Kaiser has agreed to vacate the building between 11:30 pm 14 February and 2 pm 17 February, 2014. Within this window, the planned sampling schedule is as follows:

- 11 February 2014 – Pre-sampling inspection with USEPA, SMI and tenant representatives (complete);
- 14 February 2014 – HVAC units to be shut down by Kaiser at approximately 11:30 pm;
- 14 February 2014 - 12:00 am to 16 February 2014 12:00pm - Minimum 36-hour period following HVAC unit shut down prior to sample collection;
- 16 February 2014 – Initiate indoor and outdoor air sample collection after 12 pm; and
- 17 February 2014 – Complete 24-hour sampling.

Sampling Locations

During the 11 February 2014 pre-sampling inspection, the USEPA and ERM inspectors identified 23 representative indoor air sample locations and 2 representative outdoor air sample locations. Figure 2 illustrates the locations of the selected sample locations and Table 2 presents a description of each.

Indoor Air Samples

The inspectors identified 22 first-floor and one second-floor sample locations. Selection criteria for sample locations included identification of preferential pathways (including by conducting low concentration PID monitoring), areas of regular worker exposure (e.g., office areas), and sample elevation off the floor to represent breathing zone or floor concentrations. Breathing zone samples will be collected at 3 to 5 feet above ground surface, and floor samples will be collected on the ground surface adjacent to a selected feature, such as a concrete slab penetration, floor drain, or exposed slab crack. Three locations will be selected for duplicate sampling. Samples will be collected over a 24-hour period and analyzed for the COCs and chloroform.

Outdoor Air Samples

Two outdoor air samples will be collected and analyzed for the COCs and chloroform (Figure 2 and Table 2). Outdoor air sample collection will begin 1 to 2 hours prior to the start of indoor air sample collection. Outdoor air samples will be located away from any features, such as buildings, trees, or walls that may act as a wind shield and prevent the collection of a sample of outdoor air that is representative of the general area. Sampling equipment may be locked to a fixed object (not a building, tree, or wall) to deter theft or vandalism.

Field Methods and Procedures

Field methods for this sampling event will be the same as those specified in the 2012 Work Plan, with exceptions noted in the following sections.

Pre-Field Activities

Prior to conducting sampling at the former Siemens building, SMI obtained permission for access from the owner and tenant. Prior to the pre-sampling inspection, ERM requested the tenant to complete survey forms to document chemical use and other relevant information about the building (Attachment 1).

Pre-Sampling Questionnaire

During the pre-sampling inspection, ERM and USEPA made observations of building exteriors and interiors, including factors related to chemical storage, presence of floor drains, and elevators; conditions of the concrete slab (e.g., utility conduits or cracks); and presence of HVAC units. ERM has requested information from the tenant regarding the operational parameters of the HVAC units, the building foundation, building plans, if available, as well as activities of various types of workers in the building to better understand potential exposure. The building has five different HVAC zones. The tenant has not been able to provide a map that identifies the zones or which HVAC unit services each zone.

The tenant was advised not to perform any activities during the sampling period that could impact the results of the sensitive indoor air sampling (e.g., indoor painting, solvent use). Staff at the facility were also asked to refrain from garment handling operations (i.e., avoid

bringing dry-cleaned garments into the building), smoking, building maintenance, or cleaning inside the facility during the 48-hour period prior to or during implementation of the sampling program. Additionally, the tenant was asked to turn off the building's HVAC system and close the outdoor air intakes (no outdoor makeup air) prior to and during sampling to assess the potential for vapor intrusion into the building.

Field Sampling Equipment

Both indoor and outdoor air samples will be collected using 6-liter Summa™ canisters. The flow controllers will be set for the 24-hour sample collection period.

Field Sampling Procedures

Indoor air sampling procedures will be as described in the 2012 Work Plan.

Sample Identification

Samples will be identified using the format SMI-(IA/SS/OA)##-YYYYMMDD, where:

- IA and OA represents indoor air or outdoor air, respectively;
- ## represents the sample number consecutively numbered starting with 01; and
- YYYYMMDD represents the four digit year (YYYY), two-digit month (MM), and two-digit day (DD) the sample is collected.

Sample Analyses

Samples will be analyzed as specified in the 2012 Work Plan.

Sample Documentation

Sample documentation will be as described in the 2012 Work Plan, with the exception that a different indoor air sampling form will be used (Attachment 2), and that a sample correlation log will not be necessary for the single commercial/industrial building.

DATA EVALUATION

Data evaluation will be performed as presented in the 2012 Work Plan using criteria presented on Table 1 for commercial/industrial workers.

CLOSING

If you have any questions regarding this letter, please do not hesitate to contact us.

Sincerely,



Heather Balfour, P.E.
Project Manager



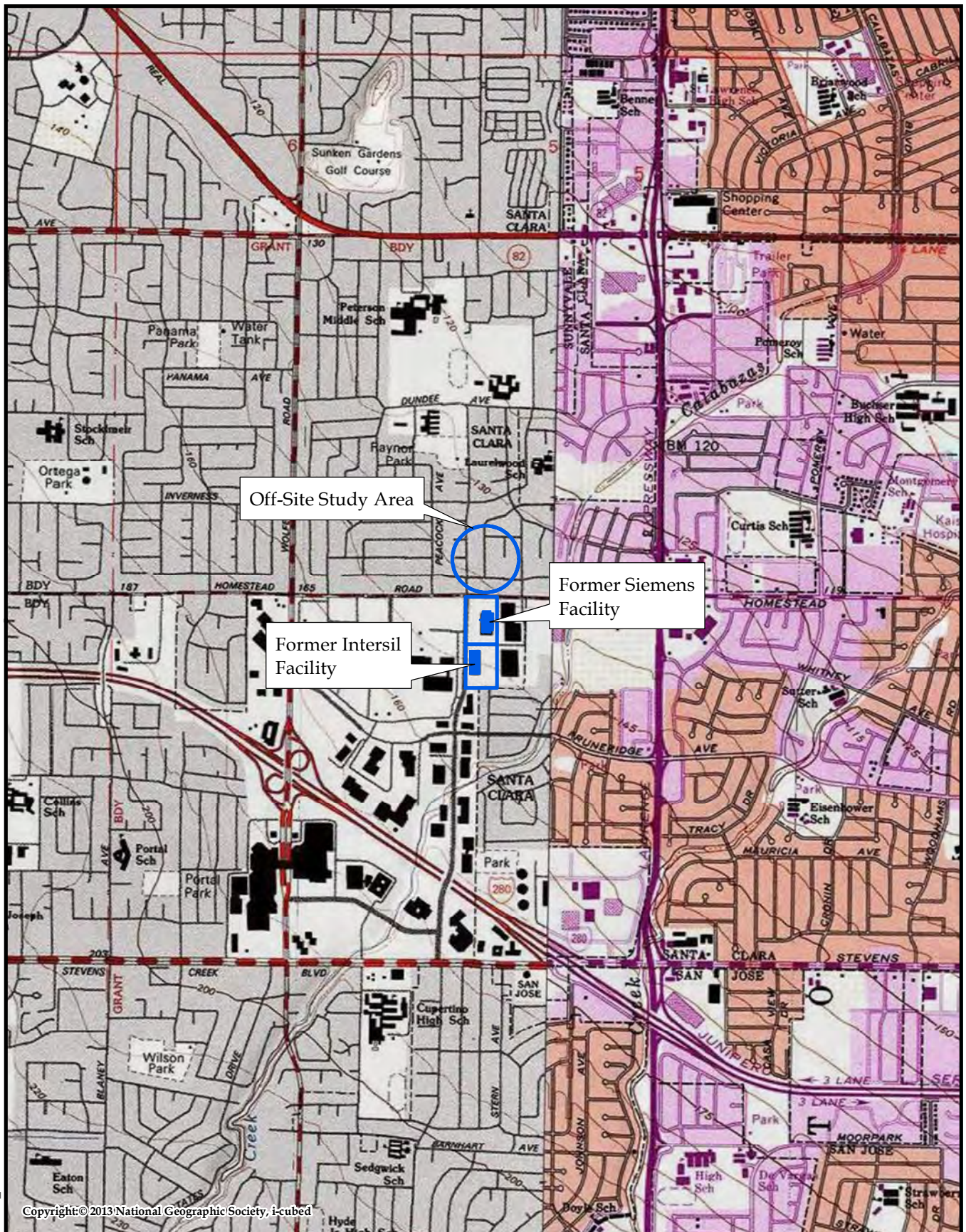
Benjamin Leslie-Bole
Partner-in-Charge

HDB/BLB/ks/dao/0201040.01SGB
enclosures:

- Figure 1 – Site Location Map
- Figure 2 – Indoor Air Study Area
- Figure 3 - Indoor Air and Ambient Air Sample Locations
- Table 1 – Screening Criteria for Comparison of Indoor Air Results
- Table 2 –Indoor Air and Ambient Air Sample Locations
- Attachment 1 –Sample Forms for Building Surveys and Inventories of Products
- Attachment 2 –Indoor Air Sampling Form – Summa Canisters

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Figures



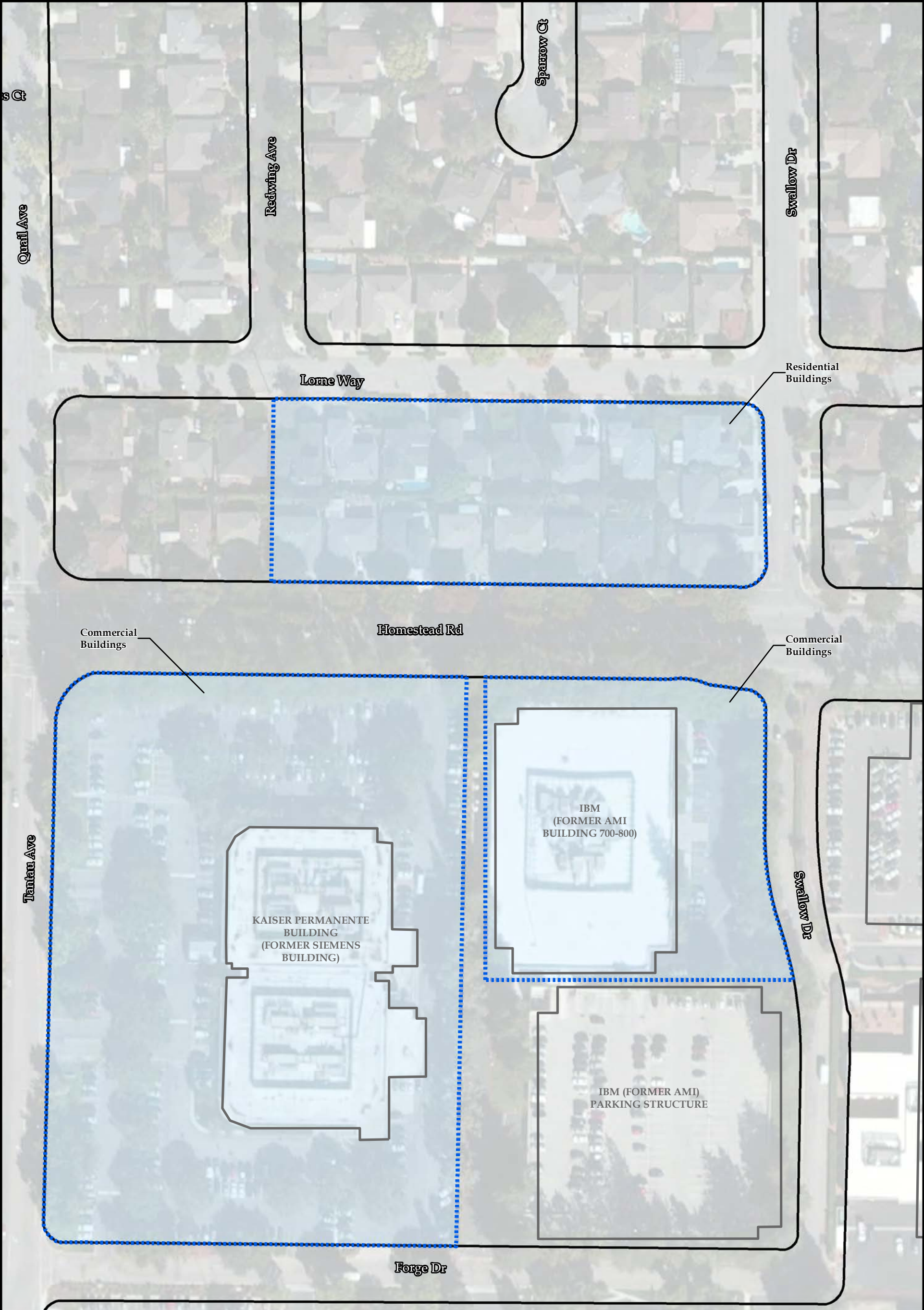
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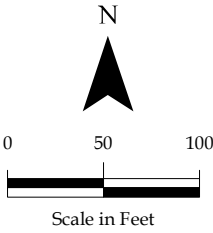
FIGURE 1
SITE LOCATION MAP
FORMER SIEMENS AND INTERSIL
FACILITIES, AND OFF-SITE STUDY AREA
CUPERTINO, CALIFORNIA

PREPARED BY:
aroe (ERM)

JOB NO. 01201040
FILE: SMI_10



- Legend**
- Building Outlines
 - City Block
 - Indoor Air Study Area



Intersil/Siemens Site
Cupertino, California

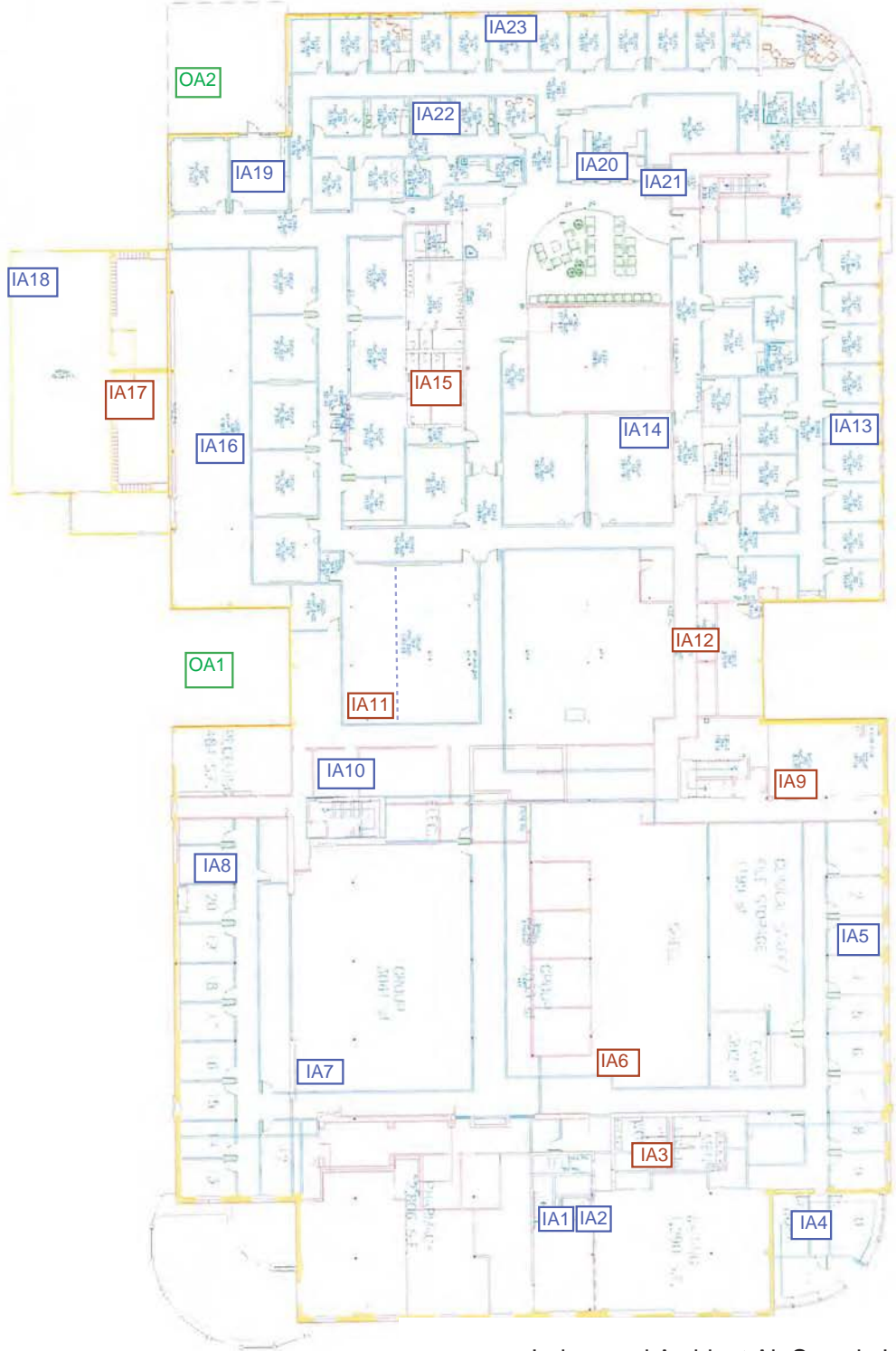
FIGURE 2
INDOOR AIR
STUDY AREA



PREPARED BY:
MKJ

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FILE: FIG_2_Indoor-Air_Study-Area

Tantau Avenue



Legend

- IA1 Breathing Zone Sample Location
- IA3 Floor Zone Sample Location
- OA1 Ambient Air Zone Sample Location

Homestead Road

Figure 3
Indoor and Ambient Air Sample Locations
Former Siemens and Intersil Facilities
Cupertino, California

Tables

Table 1
Screening Criteria for Comparison of Indoor Air Results
Intersil/Siemens Site, Indoor Air Study Area
Cupertino, California

Screening Level	Chemical of Concern	Chloro-form	1,1-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	Freon 113	1,1,1-TCA	TCE	Toluene	PCE	Vinyl Chloride
Indoor Air and outdoor air laboratory reporting limit (Summa Canisters using USEPA Method TO-15 SIM) ¹		0.49	0.081	0.040	0.079	0.04	0.77	0.11	0.11	0.075	0.14	0.026
Tier 1 – Comparison to Background/Outdoor Ambient Air												
Background (outdoor ambient air)												To be determined based on outdoor ambient air results
Tier 2 – Comparison of Short-Term Health Based Screening Criteria												
Acute Inhalation MRL ²		NA	NP	NP	790 ³	790	NP	11,000	--	3,800	1,400	1,300
Intermediate Inhalation MRL ⁴		NA	NP	79	790 ³	790	NP	3,800	--	NP	NP	77
Interim Short-term Response Action Level ⁵		--	--	--	--	--	--	--	7.0	--	--	--
Tier 3 – Comparison to Long-Term Health Based Screening Criteria												
Commercial/Industrial Screening Level – Indoor Air ⁶		NA	7.7	880	260 ³	260	130,000	22,000	3.0	22,000	2 ⁷	2.8

Notes:

All concentrations are presented in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).

1. Analytical laboratory reporting limits were provided by Eurofins Air Toxics, Inc., of Folsom, California. Reporting limits cited do not take into account sample dilution (approximate factor of 1.6) due to canister pressurization.
2. MRLs for acute exposures (i.e., exposure durations of 1 to 14 days) for the inhalation pathway (ATSDR, 2011).
3. Value published for trans-1,2-DCE is used as a surrogate for cis-1,2-DCE.
4. MRLs for intermediate exposures (i.e., exposure durations of >14 to 365 days) for the inhalation pathway (ATSDR, 2011).
5. Interim Short-term Response Action Level specified by United States Environmental Protection Agency (EPA) Region 9 (EPA, 2013b). Value is based on a 10-hour workday and a hazard index of 1. Exceedance of this concentration levels triggers mitigation; exceedance of three times this concentration triggers an immediate response.
6. Regional Screening Levels (RSLs) for industrial air (EPA, 2013a). Lower of cancer or noncancer values presented.
7. The current RSL for PCE of $47 \mu\text{g}/\text{m}^3$ reflects recent updates to PCE's toxicity criteria by EPA. However, California has not yet adopted these revised criteria. Therefore, the screening level for PCE is based on California toxicity criterion and EPA's methods for estimating exposure.

Abbreviations

1,1-DCA = 1,1-Dichloroethane
 1,1-DCE = 1,1-Dichloroethene
 cis-1,2-DCE = cis-1,2-Dichloroethene
 trans-1,2-DCE = trans-1,2-Dichloroethene
 Freon 113 = 1,1,2-Trichloro-1,2,2-trifluoroethane
 MRL = Minimal Risk Level

NA = Not applicable; chloroform is measured as an indicator of the connection between indoor air and sub-slab air and is not considered a chemical of concern for indoor air at this site.
 NP = Not published
 TCE = Trichloroethene
 PCE = Tetrachloroethene
 1,1,1-TCA = 1,1,1-Trichloroethene

References

- Agency for Toxic Substances & Disease Registry (ATSDR), 2013, Minimal Risk Levels (MRLs) for Hazardous Substances, July. <http://www.atsdr.cdc.gov/mrls/mrlslist.asp>
- U.S. Environmental Protection Agency (EPA), Regions 3, 6, and 9, 2013a, Regional Screening Levels for Chemical Contaminants at Superfund Sites, November. <http://www.epa.gov/region9/superfund/prg>.
- U.S. Environmental Protection Agency (EPA), 2013b, Memorandum from Kathleen Salyer of the EPA to Stephen Hill, Chief, Toxic Cleanup Division, California Regional Quality Control Board, December 3.

Table 2
Indoor Air and Ambient Air Sample Locations
Intersil/Siemens Site, Indoor Air Study Area
Cupertino, California

Location ID	Sample Location Name	Room Number	Floor/Breathing Zone
Indoor Air			
IA1	First Floor Elevator Sample	Homestead Entrance	Breathing Zone
IA2	Second Floor Elevator Sample	Homestead Entrance	Breathing Zone
IA3	Woman's Restroom (Floor Drain)	NA	Floor
IA4	Common Room	Adjacent to 1036	Breathing Zone
IA5	Office Sample	1035	Breathing Zone
IA6	EVS Storage Room (Floor Drain)	1094	Floor
IA7	Cube Sample In Group Room C3	1073	Breathing Zone
IA8	Office Sample	1068	Breathing Zone
IA9	Ground Penetration for Building Sprinkler System	195	Floor
IA10	Staff Lounge Sample (Collect by Sink)	1090	Breathing Zone
IA11	Public Affairs Storage Room (Floor Cracks)	NA	Floor
IA12	Ground Penetration for Building Sprinkler System	179	Floor
IA13	Office Sample (Room 104)	104	Breathing Zone
IA14	Server Room	NA	Breathing Zone
IA15	Woman's Restroom Adjacent to Chemical Dependency Waiting Room (Floor Drain)	NA	Floor
IA16	On Desk outside of Room 138B	138B	Breathing Zone
IA17	Woman's Restroom Floor (Floor Drain)	NA	Floor
IA18	Storage Area by Bathroom	125	Breathing Zone
IA19	Patient Break Room	125	Breathing Zone
IA20	Chemical Dependence Reception Office	136	Breathing Zone
IA21	First Floor Elevator Shaft	Tantau Entrance	Breathing Zone
IA22	Break Room by AED Across from Room 129 (by Sink)	133	Breathing Zone
IA23	Office Sample	118	Breathing Zone
Ambient Air			
OA1	Outdoor Air Sample (by Boiler)	NA	Breathing Zone
OA2	Outdoor Air Sample outside Patient Break Room	NA	Breathing Zone

Notes:

NA - not available

Attachment 1
Sample Forms for Building
Surveys and Inventories of
Products

**NEW YORK STATE DEPARTMENT OF HEALTH
INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY
CENTER FOR ENVIRONMENTAL HEALTH**

This form must be completed for each residence involved in indoor air testing.

Preparer's Name _____ Date/Time Prepared _____

Preparer's Affiliation _____ Phone No. _____

Purpose of Investigation _____

1. OCCUPANT:

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

Number of Occupants/persons at this location _____ Age of Occupants _____

2. OWNER OR LANDLORD: (Check if same as occupant ____)

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential
Industrial

School
Church

Commercial/Multi-use
Other: _____

If the property is residential, type? (Circle appropriate response)

Ranch	2-Family	3-Family
Raised Ranch	Split Level	Colonial
Cape Cod	Contemporary	Mobile Home
Duplex	Apartment House	Townhouses/Condos
Modular	Log Home	Other:_____

If multiple units, how many? _____

If the property is commercial, type?

Business Type(s) _____

Does it include residences (i.e., multi-use)? Y / N If yes, how many? _____

Other characteristics:

Number of floors _____ Building age _____

Is the building insulated? Y / N How air tight? Tight / Average / Not Tight

4. AIRFLOW

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

Airflow near source

Outdoor air infiltration

Infiltration into air ducts

5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)

- a. Above grade construction: wood frame concrete stone brick
- b. Basement type: full crawlspace slab other _____
- c. Basement floor: concrete dirt stone other _____
- d. Basement floor: uncovered covered covered with _____
- e. Concrete floor: unsealed sealed sealed with _____
- f. Foundation walls: poured block stone other _____
- g. Foundation walls: unsealed sealed sealed with _____
- h. The basement is: wet damp dry moldy
- i. The basement is: finished unfinished partially finished
- j. Sump present? Y / N
- k. Water in sump? Y / N / not applicable

Basement/Lowest level depth below grade: _____(feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

6. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation	Heat pump	Hot water baseboard	
Space Heaters	Stream radiation	Radiant floor	
Electric baseboard	Wood stove	Outdoor wood boiler	Other _____

The primary type of fuel used is:

Natural Gas	Fuel Oil	Kerosene
Electric	Propane	Solar
Wood	Coal	

Domestic hot water tank fueled by: _____

Boiler/furnace located in: Basement Outdoors Main Floor Other _____

Air conditioning: Central Air Window units Open Windows None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost Never

Level **General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)**

Basement	<hr/>
1 st Floor	<hr/>
2 nd Floor	<hr/>
3 rd Floor	<hr/>
4 th Floor	<hr/>

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

- | | |
|--|------------------------------------|
| a. Is there an attached garage? | Y / N |
| b. Does the garage have a separate heating unit? | Y / N / NA |
| c. Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car) | Y / N / NA
Please specify <hr/> |
| d. Has the building ever had a fire? | Y / N When? <hr/> |
| e. Is a kerosene or unvented gas space heater present? | Y / N Where? <hr/> |
| f. Is there a workshop or hobby/craft area? | Y / N Where & Type? <hr/> |
| g. Is there smoking in the building? | Y / N How frequently? <hr/> |
| h. Have cleaning products been used recently? | Y / N When & Type? <hr/> |
| i. Have cosmetic products been used recently? | Y / N When & Type? <hr/> |

- j. Has painting/staining been done in the last 6 months? Y / N Where & When? _____
- k. Is there new carpet, drapes or other textiles? Y / N Where & When? _____
- l. Have air fresheners been used recently? Y / N When & Type? _____
- m. Is there a kitchen exhaust fan? Y / N If yes, where vented? _____
- n. Is there a bathroom exhaust fan? Y / N If yes, where vented? _____
- o. Is there a clothes dryer? Y / N If yes, is it vented outside? Y / N
- p. Has there been a pesticide application? Y / N When & Type? _____

Are there odors in the building?

Y / N

If yes, please describe: _____

Do any of the building occupants use solvents at work?

Y / N

(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist)

If yes, what types of solvents are used? _____

If yes, are their clothes washed at work?

Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly)

No

Yes, use dry-cleaning infrequently (monthly or less)

Unknown

Yes, work at a dry-cleaning service

Is there a radon mitigation system for the building/structure? Y / N Date of Installation: _____

Is the system active or passive? Active/Passive

9. WATER AND SEWAGE

Water Supply: Public Water Drilled Well Driven Well Dug Well Other: _____

Sewage Disposal: Public Sewer Septic Tank Leach Field Dry Well Other: _____

10. RELOCATION INFORMATION (for oil spill residential emergency)

a. Provide reasons why relocation is recommended: _____

b. Residents choose to: remain in home relocate to friends/family relocate to hotel/motel

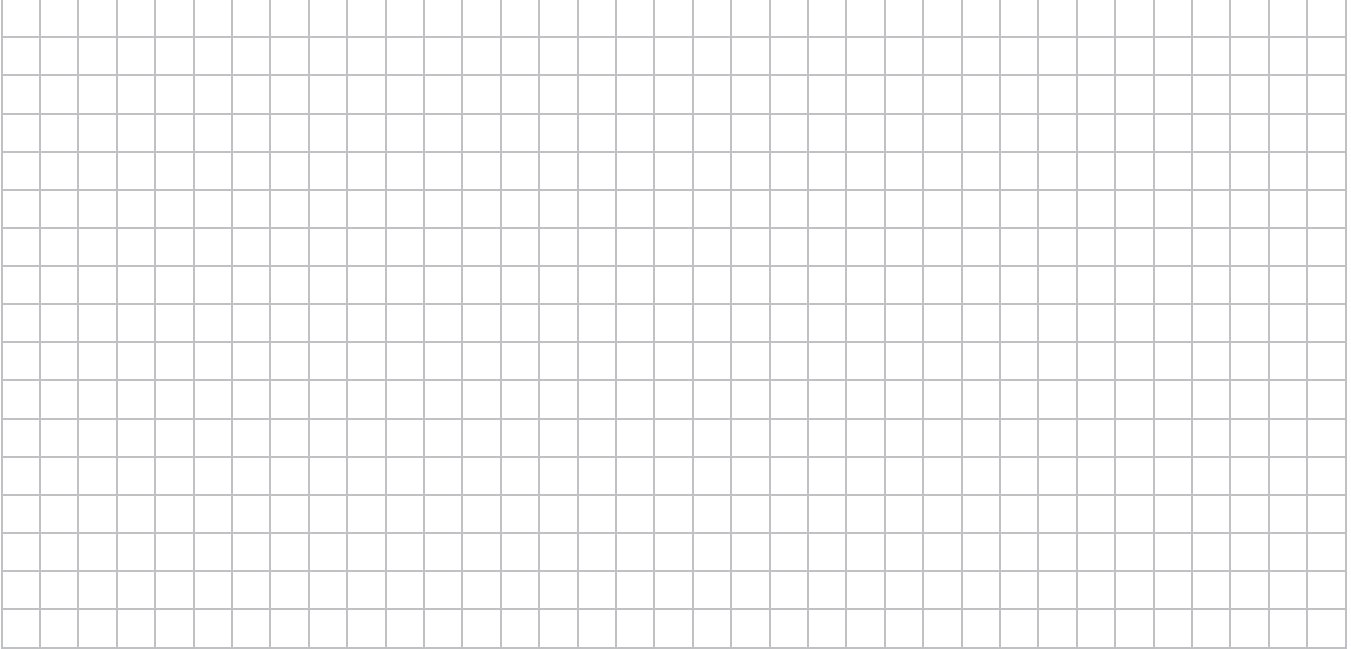
c. Responsibility for costs associated with reimbursement explained? Y / N

d. Relocation package provided and explained to residents? Y / N

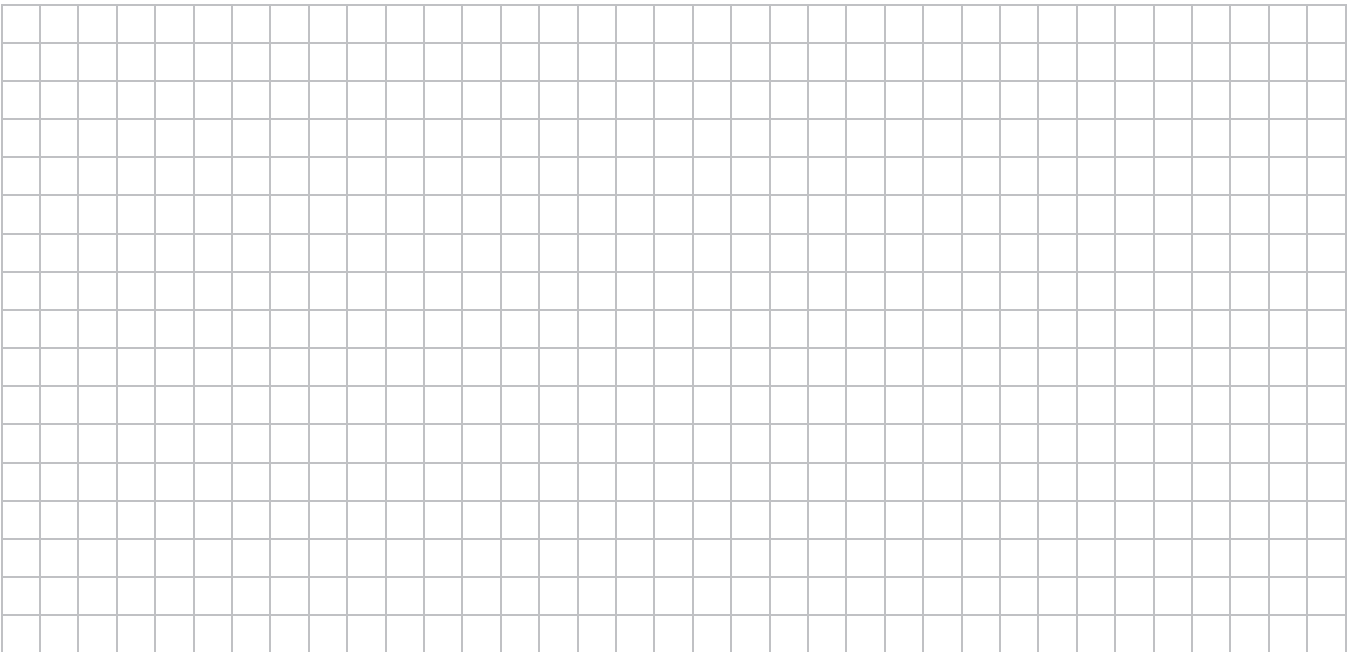
11. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

Basement:



First Floor:



12. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.



13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: _____

List specific products found in the residence that have the potential to affect indoor air quality.

[illegible]

* Describe the condition of the product containers as **Unopened (UO)**, **Used (U)**, or **Deteriorated (D)**

** Photographs of the **front and back** of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

HVAC Checklist - Short Form

Page 1 of 4

Building Name: _____ Address: _____

Completed by: _____ Date: _____ File Number: _____

Sections 2, 4 and 6 and Appendix B discuss the relationships between the HVAC system and indoor air quality.

MECHANICAL ROOM

■ Clean and dry? _____ Stored refuse or chemicals? _____

■ Describe items in need of attention _____

MAJOR MECHANICAL EQUIPMENT

■ Preventive maintenance (PM) plan in use? _____

Control System

■ Type _____

■ System operation _____

■ Date of last calibration _____

Boilers

■ Rated Btu input _____ Condition _____

■ Combustion air: is there at least one square inch free area per 2,000 Btu input? _____

■ Fuel or combustion odors _____

Cooling Tower

■ Clean? no leaks or overflow? _____ Slime or algae growth? _____

■ Eliminator performance _____

■ Biocide treatment working? (list type of biocide) _____

■ Spill containment plan implemented? _____ Dirt separator working? _____

Chillers

■ Refrigerant leaks? _____

■ Evidence of condensation problems? _____

■ Waste oil and refrigerant properly stored and disposed of? _____

HVAC Checklist - Short Form

Page 2 of 4

Building Name: _____ Address: _____

Completed by: _____ Date: _____ File Number: _____

AIR HANDLING UNIT

■ Unit identification _____ Area served _____

Outdoor Air Intake, Mixing Plenum, and Damper

■ Outdoor air intake location _____

■ Nearby contaminant sources? (describe) _____

■ Bird screen in place and unobstructed? _____

■ Design total cfm _____ outdoor air (O.A.) cfm _____ date last tested and balanced _____

■ Minimum % O.A. (damper setting) _____ Minimum cfm O.A. $\frac{(\text{total cfm} \times \text{minimum \% O.A.})}{100} =$ _____

■ Current O.A. damper setting (date, time, and HVAC operating mode) _____

■ Damper control sequence (describe) _____

■ Condition of dampers and controls (note date) _____

Fans

■ Control sequence _____

■ Condition (note date) _____

■ Indicated temperatures supply air _____ mixed air _____ return air _____ outdoor air _____

■ Actual temperatures supply air _____ mixed air _____ return air _____ outdoor air _____

Coils

■ Heating fluid discharge temperature _____ ΔT _____ cooling fluid discharge temperature _____ ΔT _____

■ Controls (describe) _____

■ Condition (note date) _____

Humidifier

■ Type _____ if biocide is used, note type _____

■ Condition (no overflow, drains trapped, all nozzles working?) _____

■ No slime, visible growth, or mineral deposits? _____

HVAC Checklist - Short Form

Page 3 of 4

Building Name: _____ Address: _____

Completed by: _____ Date: _____ File Number: _____

DISTRIBUTION SYSTEM

Zone/ Room	System Type	Supply Air		Return Air		Power Exhaust		
		ducted/ unducted	cfm*	ducted/ unducted	cfm*	cfm*	control	serves (e.g. toilet)

Condition of distribution system and terminal equipment (note locations of problems)

- Adequate access for maintenance? _____
- Ducts and coils clean and obstructed? _____
- Air paths unobstructed? supply _____ return _____ transfer _____ exhaust _____ make-up _____
- Note locations of blocked air paths, diffusers, or grilles _____
- Any unintentional openings into plenums? _____
- Controls operating properly? _____
- Air volume correct? _____
- Drain pans clean? Any visible growth or odors? _____

Filters

Location	Type/Rating	Size	Date Last Changed	Condition (give date)

HVAC Checklist - Short Form

Page 4 of 4

Building Name: _____ Address: _____

Completed by: _____ Date: _____ File Number: _____

OCCUPIED SPACE

Thermostat types _____

Zone/ Room	Thermostat Location	What Does Thermostat Control? (e.g., radiator, AHU-3)	Setpoints		Measured Temperature	Day/ Time
			Summer	Winter		

Humidistats/Dehumidistats type _____

Zone/ Room	Humidistat/ Dehumidistat Location	What Does It Control?	Setpoints (%RH)	Measured Temperature	Day/ Time

■ Potential problems (note location) _____

■ Thermal comfort or air circulation (drafts, obstructed airflow, stagnant air, overcrowding, poor thermostat location)

■ Malfunctioning equipment _____

■ Major sources of odors or contaminants (e.g., poor sanitation, incompatible uses of space)

Attachment 2
Indoor Air Sampling Form –
Summa Canisters

INDOOR AIR SAMPLING FORM—SUMMA CANISTERS

Page 1 of ____

Project and Task No.: _____

Sampled by: _____

Project Name: _____

Date: _____

Project Address: _____

Weather: _____

[illegible]

Tubing volume/linear foot (in cc) calculated by: $95.76 \times [\text{tubing diameter (in cm)}]^2$